

S1D030120C

Silicon Carbide Schottky Diode

V_{RRM}	=	1200 V
$I_F (T_c=135^\circ\text{C})$	=	42 A
Q_C	=	172 nC

Feature

- 1.2kv schottky Rectifier
- Zero Reverse Recovery Current / Zero forward recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Low forward voltage
- Positive Temperature Coefficient on V_F
- Increased Creepage/Clearance Distance

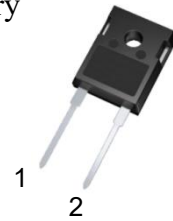
Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- High Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- AC/DC converters

Package



TO-247-2L



Part Number	Package	Marking
S1D030120C	TO-247-2L	S1D030120C

Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current	90 42 30	A	$T_c = 25^\circ\text{C}$ $T_c = 135^\circ\text{C}$ $T_c = 152^\circ\text{C}$	Fig.7
I_{FSM}	Non-Repetitive Peak Forward Surge Current	200	A	$T_c = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine Pulse	
P_{tot}	Power Dissipation	375 162	W	$T_c = 25^\circ\text{C}$ $T_c = 110^\circ\text{C}$	Fig.6
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R = 0\sim 960\text{V}$	
$\int i^2 dt$	$\int i^2 dt$	219	A ² S	$T_c = 25^\circ\text{C}$, $t_p = 10$ ms	
T_{stg}, T_J	Operating Junction Range	-55 to +175	$^\circ\text{C}$		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.4 1.9	1.8 2.5	V	$I_F = 30A, T_J = 25^\circ C$ $I_F = 30A, T_J = 175^\circ C$	Fig.1
I_R	Reverse Current	1 15	150 300	μA	$V_R = 1200V, T_J = 25^\circ C$ $V_R = 1200V, T_J = 175^\circ C$	Fig.2
Q_c	Total Capacitive Charge	172		nC	$V_R = 800V, I_F = 15A$ $di/dt = 200A/\mu s, T_J = 25^\circ C$	Fig.4
C	Total Capacitance	3182 153 112		pF	$V_R = 0V, T_J = 25^\circ C, f = 1MHz$ $V_R = 400V, T_J = 25^\circ C, f = 1MHz$ $V_R = 800V, T_J = 25^\circ C, f = 1MHz$	Fig.3
E_c	Capacitance Stored Energy	91		μJ	$V_R = 800V$	Fig.5

Thermal Characteristics

symbol	parameter	Typ	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.4	$^\circ C/W$	Fig. 8

Typical Performance

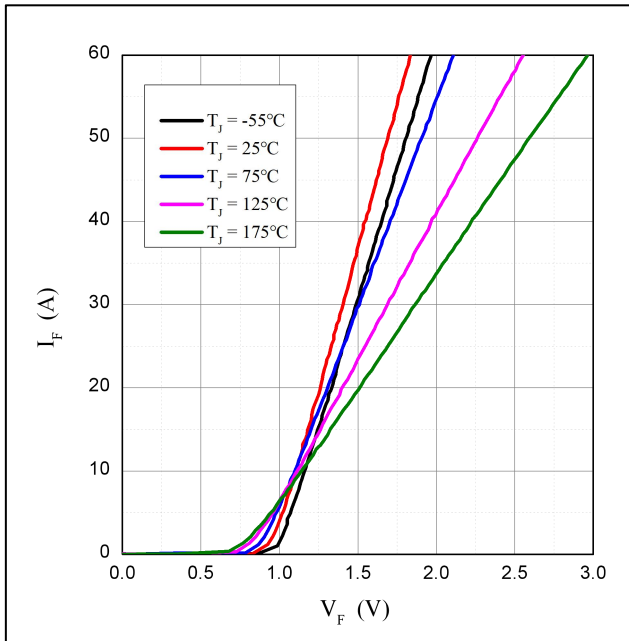


Figure 1: Forward Characteristics

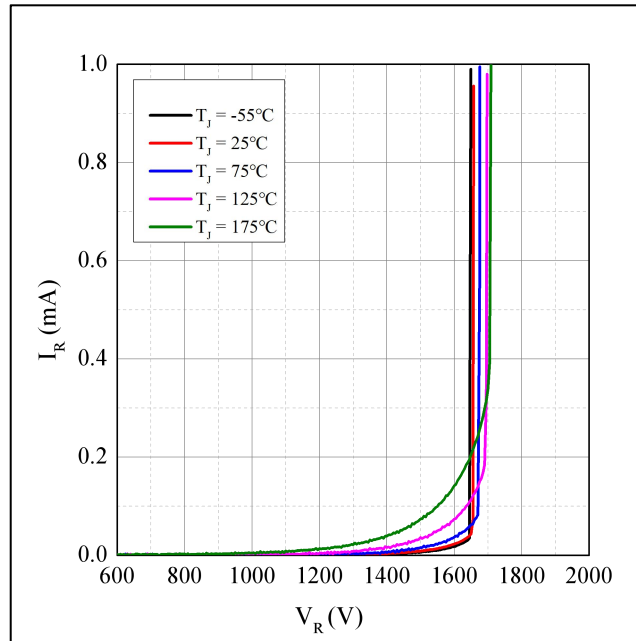


Figure 2: Reverse Characteristic

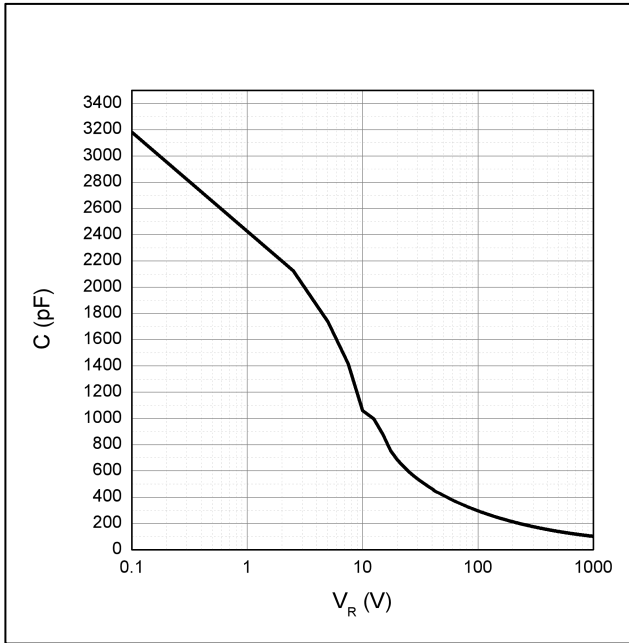


Figure 3: Capacitance vs. Reverse Voltage

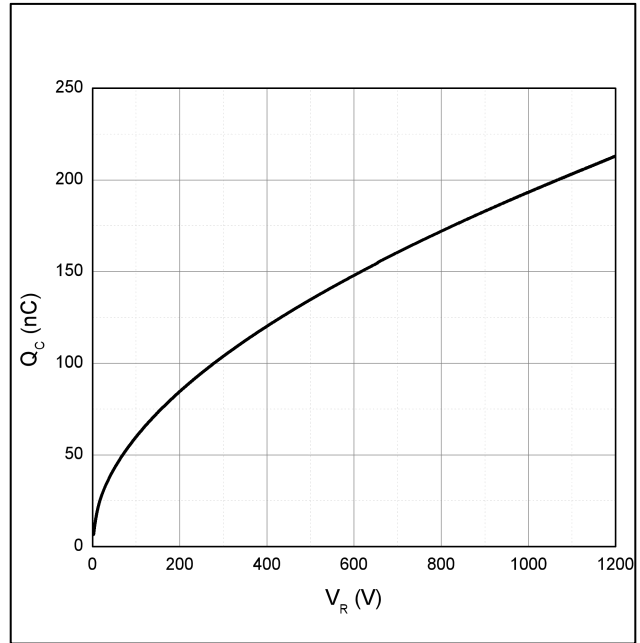


Figure 4: Recovery Charge vs. Reverse Voltage

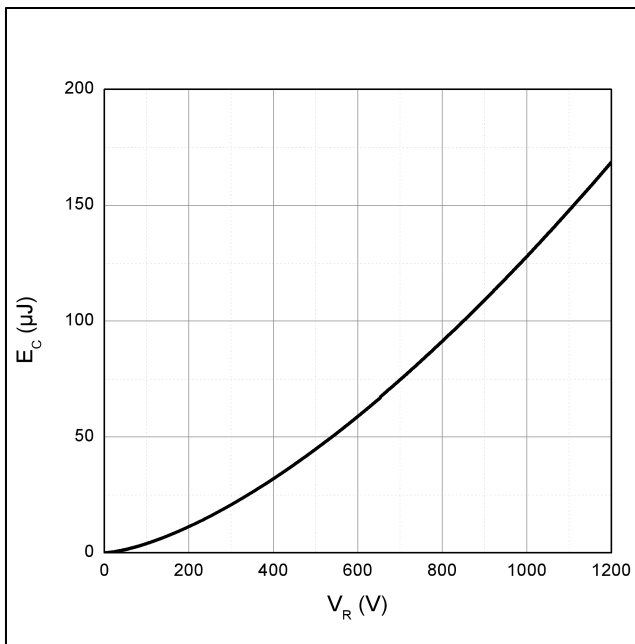


Figure 5: Typical Capacitance Stored Energy

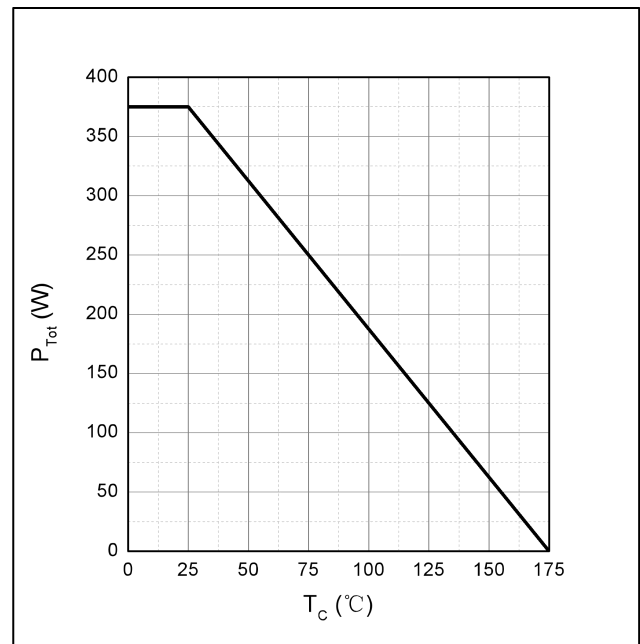


Figure 6: Power Derating

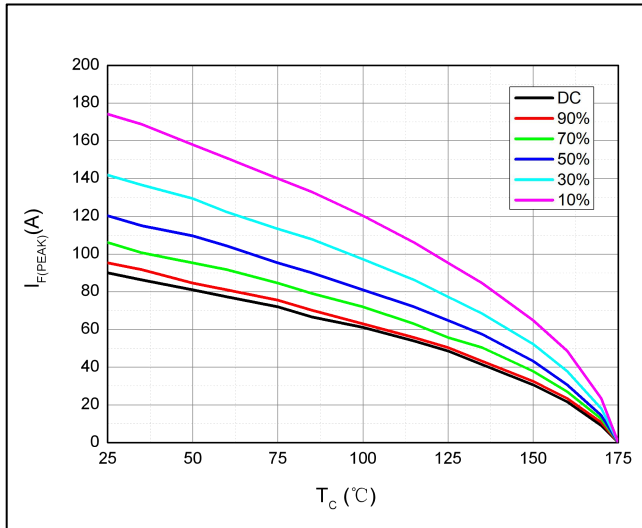


Figure 7: Current Derating

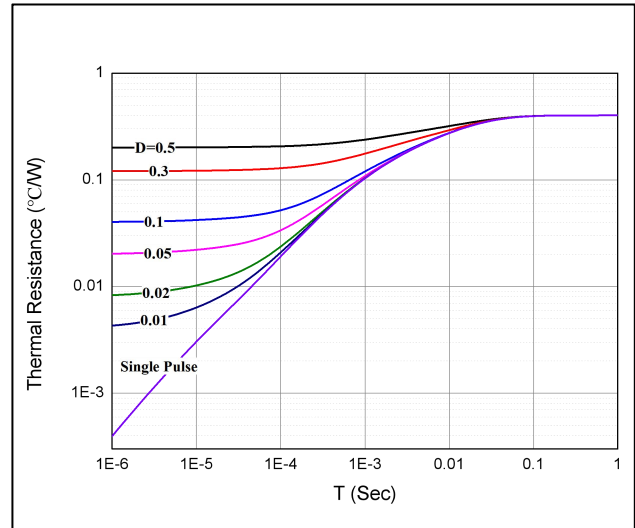
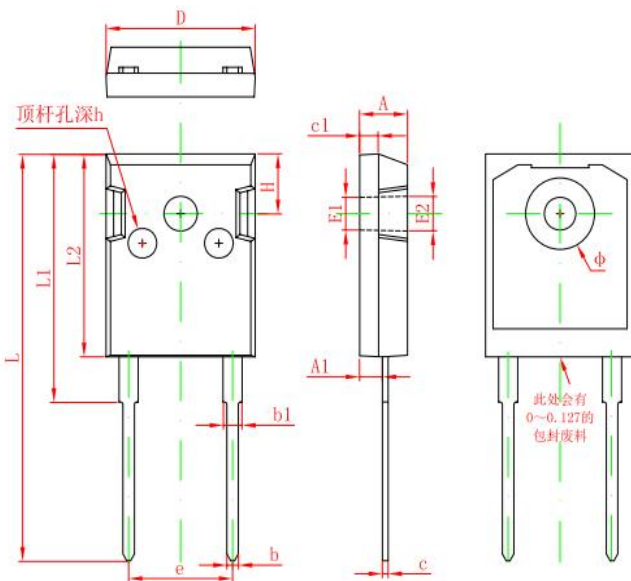


Figure 8: Transient Thermal Impedance

Package Dimensions

Package TO-247-2L



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	10.900 TYP		0.429 TYP	
H	5.980 REF		0.235 REF	
h	0.000	0.300	0.000	0.012

Attention

1. Rohs compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2. REACH compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Sichain representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

3. With respect to information regarding the application of the product, Sichain hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

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6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sichain office.

7. Except as otherwise explicitly approved by Sichain in a written document signed by authorized representatives of Sichain, Sichain' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment, primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, and power transmission systems.